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THE HIGH SCHOOL Journal

this issue

Psychology and the High School Teacher

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The HIGH SCHOOL JOURNAL

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Psychology and the High School Teacher

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The science of education should provide practical assistance to high school teachers. The reporting of significant psychological research is too frequently confined to technical journals of limited circulation. This does not seem to be the fault of either the experimenter or the teacher.

This issue of the *High School Journal* is devoted to a portion of the vast field of educational psychology. Authorities in the fields of human development, marking and evaluation, the teaching of reading, provision for slow learners and atypical children, educational statistics, and counseling have been asked to abstract from their familiarity with recent studies the findings which seem of greatest significance to the practitioner.

It is the hope of the editors that the material presented will stimulate further study by those in the field and better understanding of the complexity of our job as teachers. If any of our readers find here points on which they want further discussion or explanation we will be glad to make available space for their comments and questions.

The Contribution of Research in Human Development to High School Teaching

FLORENCE L. GOODENOUGH
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THAT sound educational practice demands an understanding of the human material with which it deals is conceded by all. Since the human organism is neither inert nor static but grows and changes in accordance with the laws of its own nature under the environmental conditions in which it is nurtured, it is the task of the psychologist to ascertain what these laws may be and to describe their manifestations in terms of overt behavior.

For both the psychologist and the educator, a clear definition of objectives and methods is essential. The psychologist must know just what relationships he is attempting to investigate. He must be aware of the limitations of his findings and thus be able to define the circumstances under which they may be expected to hold good. In the absence of such information the teacher who wishes to make his methods of instruction conform to psychological principles may be greatly misled. But the need for a clear definition of goals is not confined to the psychologist. If he is to make effective use of scientific information, the teacher likewise must have developed a rather definite educational philosophy in terms of the ends to be achieved, the kind of men and women he would like his students to become. With these goals in mind he can then utilize the psychological literature as a guide in choosing among the various educational environments at his command, that one which seems best suited to bring about the desired results.

From the standpoint of the high school teacher, the psychological studies most likely to be helpful may be divided into three general classes as follows: (1) normative investigations designed to show the level of ability or the type of behavior most typical of a given group, (2) studies of the characteristics of those individuals who differ from these standards in some specified degree or manner, and (3) investigations of the factors likely to be associated with such deviations with a view to ascertaining by what means desirable changes may be brought about and undesirable ones may be minimized or avoided.

Of the general texts and reviews in the field of child psychology, by far the most through-going is the *Manual of Child Psychology*

edited by Leonard Carmichael.[1] Each of the nineteen chapters is a complete unit in itself and is followed by a comprehensive bibliography. The high school teacher is likely to be most interested in the chapters on "Learning in Children" by Norman L. Munn, "The Measurement of Mental Growth in Childhood" by Florence L. Goodenough, "Environmental Influences on Mental Development" by Harold E. Jones, and "The Adolescent" by Wayne Dennis. The chapter on "Gifted Children" by Catherine Cox Miles will also appeal to many. Another recent contribution to this field is *The Psychology of Development and Personal Adjustment* by John E. Anderson.[2] Although it is addressed primarily to the college freshman, the book is rich in illustrative material designed to show that personal adjustment is not only a developmental process but one that is largely achieved by the individual himself. External conditions may and do affect the difficulty of making a satisfactory adjustment, but rarely, if ever, do they render it impossible. This book may well be recommended reading for the more thoughtful and intelligent high school students. Teachers also may find that it challenges many of their accepted ideas and provides new food for thought.

The literature on human differences has been admirably reviewed by Leona Tyler[3] who has accompanied her factual reports of the findings of her colleagues with a keenly critical analysis of possible sources of error in the conclusions drawn and of factors likely to have influenced the results or the author's interpretation of them. Teachers who wish to gain a better understanding of the differences they observe among their students or those who would like to find out what is known about such questions as the relative ability of the sexes or of different national-racial groups will find Tyler's book well worth the reading.

For obvious reasons, the period of adolescence constitutes the phase of development that is of greatest interest to high school teachers. Hurlock's recent book[4] on this topic not only covers the important literature in the field but presents many thoughtful and sympathetic discussions of the special problems confronting the adolescent which stem in part from the physiological changes that occur at this time with their accompaniments of changes in bodily size and contour and the development of new interests and desires;

[1] Leonard Carmichael. *A Manual of Child Psychology.* New York, John Wiley and Sons, 1946. Pp. vi + 1068.

[2] John E. Anderson. *The Psychology of Development and Personal Adjustment.* New York, Henry Holt and Company, 1949. Pp. xvi + 720.

[3] Leona E. Tyler, *The Psychology of Human Differences.* New York, Appleton-Century-Crofts Company, 1947. Pp. xii + 420.

[4] Elizabeth B. Hurlock. *Adolescent Development.* New York, McGraw-Hill Book Company, 1949. Pp. 562.

in part from the social pressures and increased responsibilities incident to the progress from childhood to youth.

Recent stress on the desirability of following the progress of the same children over a period of years has led to the organization of a number of such longitudinal investigations. The fourth volume of *Genetic Studies of Genius*[5] presents the findings from what is unquestionably the most complete and extensive study of this kind that has ever been made. Of the original group of almost 1500 children whose IQ's in childhood were so high as to rank them at or above the 99.5 percentile of the general population, well over 90 per cent were still being followed after a quarter of a century had elapsed. Volume III of this series[6] describes the behavior and accomplishments of these young people during adolescence.

No complete account of either of the two major longitudinal studies of unselected children—the Harvard Growth Study and the Berkeley study of adolescents—has as yet appeared, but a number of research articles and several monographs dealing with special phases of each have been published. Only one of these will be mentioned here. In his *Development in Adolescence,* Jones[7] presents a detailed analysis of the characteristics of a single boy and of the developmental changes that occurred from the time of his entrance into Junior High School at the age of 12½ up to the time of his graduation from Senior High School at the age of 18. During this time a very large number of tests of various kinds were given to him, and judgments regarding his abilities, interests, and personal-social characteristics were obtained from his teachers, from his associates, and from himself. It is shown how, from a timid, solitary youngster suffering from many physical, mental, and social handicaps he gradually developed into a moderately well-adjusted youth, who, at last report, was making satisfactory though not outstanding progress in his freshman year in college. In discussing the many factors that seemed responsible for this change, Jones remarks that "the improvement in the boy's personal fortunes is evidence not only of the toughness of the human organism but also of the slow, complex ways in which nature and culture may come into adaptation."

[5] Lewis M. Terman and Melita E. Oden. *The Gifted Child Grows Up. Twenty-five Years' Follow-Up of a Superior Group.* Vol. IV of *Genetic Studies of Genius* edited by Lewis M. Terman. Stanford University, California, Stanford University Press, 1947. Pp. xiv + 448.

[6] Barbara Stoddard Burks, Dortha Williams Jensen, and Lewis M. Terman. *The Promise of Youth: Follow-up Studies of a Thousand Gifted Children.* Vol. III of *Genetic Studies of Genius* edited by Lewis M. Terman. Stanford University, California, Stanford University Press, 1930. Pp. xiv + 508.

[7] Harold E. Jones. *Development in Adolescence. Approaches to the Study of the Individual.* New York, Appleton-Century-Crofts Company, 1943. Pp. xvii + 166.

We need more studies of this kind. Group studies are of unquestioned value, but it is easy to lose sight of the individual in the mass. Here is where the teacher can help. If a number of high school teachers were each to select one of their students for intensive study throughout the high school period, keep careful records of his behavior and of all important events that occur in his life, become acquainted with his home and family, observe his friendships, his reading, his out-of-school activities, and subsequently organize the material in shape for publication, not only would the teachers gain immeasurably in their understanding of adolescent behavior but a real contribution to scientific knowledge would thereby be made. To be worth doing such records must be kept at the time, for memory cannot be trusted. Although few if any high school teachers will find it possible to duplicate the elaborate series of tests and measurements made by Jones, group tests of intelligence and achievement are given periodically in most modern high schools; the general health examination will usually include records of height and weight and of any major physical defects. Moreover the ingenious and enterprising teacher will usually find it possible to secure much additional data of an objective or semi-objective kind, such as ratings by other teachers and by the boy's associates, group tests of interests and personality that she can administer herself, etc. Even rather subjective material takes on a kind of quasi-objectivity if it is obtained for the same subject in the same way at regular intervals over a term of years. Furthermore, the teacher's intimate daily contact with the subject with its many opportunities for informal observation and recording will provide a wealth of material which, if analyzed in such a way as to tease out significant relationships may reveal more that is important for psychology and education than can possibly be derived from the most elaborate series of tests administered and analyzed by one who is ignorant of the personal history of the subject to whom they are given.

Improvement of Evaluation of Achievement in High Schools*

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ALL HIGH SCHOOL teachers and administrators will agree with the statement that the best index of the effectiveness of evaluation of student achievement is the extent to which evaluation increases the effectiveness of instruction. It is not often realized, however, that improvement in evaluation cannot occur without concomitant improvement of instruction. In fact, efforts to improve evaluation may well begin with efforts to improve instruction. Where teaching is characterized by emphasis on the imparting of the content of the text or course of study and is not directed toward the attainment of clearly defined and comprehensive objectives, in fairness to the students, evaluation must be restricted to measurement of the information they have thus obtained. Under such conditions there is little justification for use of tests other than ones containing series of factual essay or objective exercises. Hence, as a first step in the improvement of evaluation, it is recommended that consideration be given to the formulation of meaningful objectives whose scope is wide enough to include, in addition to knowledge and understandings, objectives relevant to the application of knowledge and understandings to situations requiring critical thinking and attitudes, ideals, interests, tastes, and appreciations. It is not sufficient to define the objectives—instruction must be modified if measurable changes in the students are to occur. Suppose, for example, that one of the objectives defined is the ability to interpret observational or experimental data. As will be indicated later, instruments are available or can be locally constructed to evaluate the attainment of this ability. How can one justify the use of such an instrument, however, unless some effort has been made in instruction to train students to interpret data?

Many high school teachers will contend that essay tests measure much more worth-while abilities than are measured by objective tests. Unfortunately, however, most teacher-made essay tests are as restricted in function as most objective tests. In the content fields, the typical essay test is a brief series of factual questions and

* This article, originally written for publication in the *High School Journal*, is also being published simultaneously in the *Chicago Schools Journal*.

is scored in terms of the facts remembered. In English composition, the scoring is all too often restricted to evaluation of errors in grammar and mechanics, sentence fragments, misspellings, and so on, which are measured more reliably by means of objective exercises.[1] In the content fields, essay tests should be used not to measure only information or knowledge, but to gain insight with respect to student's patterns of thinking. Essay questions should be thought questions. They should not be too specific or detailed in character. For example, an essay question which asks the students to write a discussion of Henry Clay's "American System" is likely to promote more thought on the part of the students with respect to what to say and how to say it, than the statement "Describe how Henry Clay expected his American System to benefit the North, South, and West in terms of manufacturing, agriculture, and transportation." Such an essay exercise gives the student less freedom with respect to what to say and how to organize what he says, since the exercise itself suggests what is to be discussed and in what order. The mere request to discuss Henry Clay's American System, preceded by the appropriate kind of instruction should stimulate, not only recall of the important characteristics of the System, but, at least on the part of the better students, analysis and criticism of Clay's proposals.

In many cases, it is desirable to use questions which involve such words as "contrast," "compare," "justify," "explain," and "prove." The questions should require a student to apply his knowledge to novel problematic situations. For example, students who have learned in social studies something concerning the characteristics of culture lag and of the operation of vested interests might be asked to "Compare the possible consequences of the introduction of atomic energy in industry with the consequences which resulted from the introduction of steam as a source of power." It is to be hoped that, while previous instruction has dealt with the industrial revolution, culture lag, and the matter of vested interests, no attempt has been made by the teacher to predict what will occur as atomic energy is introduced as a source of power.

Student answers to essay exercises of the types advocated above should be read with the purpose of evaluating how the learning experiences provided in instruction have affected the students. In addition to whether the response is evidence of adequate possession of information, the teacher should be alert to whether or not the response is evidence with respect to the acquisition of the ability

[1] Irving A. Berg, Graham Johnson, and Robert P. Larsen. "The Use of an Objective Test in Predicting Rhetoric Grades," *Educational and Psychological Measurement*, 4:429-435, Autumn, 1945.

to select relevant facts, to weigh them, and to organize and to apply them in the situation presented by the question. To what extent is the response of the student colored by biases or prejudices? To what extent does the student reveal critical judgment with respect to the facts he mentions? Does the student tend to go beyond the facts? What attitudes or values is the student acquiring? The responses of the students may be rated with respect to such aspects of their responses and the ratings combined to yield scores for the essay test as a whole. More important, however, than the effort to secure scores which may become one of the means of determining course marks, is to use such essay testing as an instrument in the improvement of instruction, and particularly improvement of the instruction of students as individuals.[2]

One should not assume from what has been said above that there is no legitimate place for the measurement of information. Facts, concepts, or understandings essential to effective thinking in a subject matter field should form the basis for numerous objective exercises. Before writing an exercise relevant to some fact, consideration should be given to the importance of the fact. Is it a fact that is worth remembering? After such facts or concepts have been identified, one or more types of objective exercises may be written. Each series of exercises should consist of items of the same type to avoid confusion with respect to directions. In writing true-false exercises, avoid making broad generalizations obviously true or false because of such determiners as "all" or "none," although such a statement as "all amphibians live in fresh water" will baffle the student since this statement, seemingly false, is actually true. Avoid also the writing of long statements containing qualifying phrases. Test-wise students realize that such statements are usually true. Do not write statements that are partly true and partly false, for example, "Green plants engage in photosynthesis, but respiration is restricted to animals." Truth or falsity should not depend on the meaning of an obscure word or of a minor detail in the statement.

The testing of knowledge of the meanings of important terms is often effectively accomplished by means of matching exercises. A series of definitions may be given accompanied by a numbered list of the terms defined. Usually the number of terms listed should be greater than the number of definitions given. The definitions should concern terms likely to be confused by the student whose

[2] For more extended discussion of these points of view with respect to essay testing see:

Verner M. Sims. "The Essay Examination Is a Projective Technique," *Educational and Psychological Measurement*, 8:15-31, Spring, 1948.

knowledge is inadequate. The extra terms should not be obviously out of place in the list of terms. All terms may be listed in alphabetical order to aid the student and neither the list of definitions nor the list of terms should be too long. Twelve definitions and fifteen to eighteen terms are reasonable numbers. When machine-scoring is used, groups of three definitions and five terms should be given.

Multiple-choice exercises containing five answers, one of which is correct, are a standard type of objective exercise. Such exercises may begin with a question, or the introductory part of the exercise may be the beginning of a sentence grammatically completed by *each* of the answers. In either case the initial part of the exercise should set the problem of the exercise. Do not begin such an exercise "Gerrymandering is . . . ." and conclude the exercise with five long answers. It is better to begin "Redistricting a state in such a way as to insure the party in power a majority in each district is called . . . ." Then "gerrymandering" can be one of five brief answers. Other precautions in the writing of multiple-choice exercises include the formulation of none but reasonably plausible incorrect answers, the listing of answers in columns for easy reading where the answers are longer than single words or very brief phrases, and the avoidance of so phrasing the correct answers that they are most often the longest answers.

One more type of objective exercise may be suggested. Words, phrases, or sentences may be classified by the student according to certain categories. For example, in a high school English test the following directions may precede a series of fifteen to eighteen sentences:

> On the blank preceding each of the following sentences, write the letter
> *A* if the sentence is fragmentary.
> *B* if the sentence contains a comma fault.
> *C* if the sentence contains a dangling modifier.
> *D* if the sentence exemplifies lack of parallelism or faulty parallelism.
> *E* if the sentence is correct.
>
> ---
>
> _____ The student wrote a theme, however, he neglected to hand it to his instructor.
> _____ At last winning his commission as a lieutenant in the army.
> _____ Mary has energy, charm, intelligence, and she is beautiful.
>
> ---

The categories may pertain to related, but different things. There should be one or more items to be classified according to each category. It is often effective to use such categories as "A

if the item is true of sound, B if the item is true of light, C if the item is true of both, and D if the item is true of neither." As in the cases of matching exercises and of multiple-choice exercises, if relationships exist between the various answers or items, more is evaluated than sheer memory of information. The student is required to do discriminative thinking in selecting the correct answers.

The closing sentence of the preceding paragraph suggests that objective exercises need not be restricted in function to the measurement of memory of information. In addition to provision of answers which appear equally plausible, the content of objective exercises can be such as to constitute novel or problematic situations. For example, suppose that students of general science have studied the characteristics of the solar system as it is. Then suppose that the instructor devises an objective exercise involving the following categories:

> On the line preceding each of the following items, write the letter
> *A* if the item would be true if the orbit of the Earth were a circle rather than an ellipse.
> *B* if the item would be true if the Earth had no Moon.
> C if the item would be true if the Earth were not inclined on its axis.
> *D* if the item would be true if the Earth were a perfect sphere rather than flattened at the poles.

Frequently, one can write multiple-choice exercises which present novel situations. For example, "One of the functions of a lymph node is comparable to the function of (A. the liver in storing sugar; B. a filter in purifying water; C. the pancreas in producing a hormone; D. the stomach in secreting an enzyme; E. a pump in raising water to a higher level)." Of course, if the students have been told that one function of a lymph node is analogous to the function of a filter in purifying water, the exercise will not present a novel situation. Another device to enhance thinking is to make all the answers of multiple-choice exercises correct in some degree and to direct the student to select the "best" answer for each exercise, or even the best and worst.

Dependence on the recall of information may be minimized and the justification for attributing differences in scores to differences in the ability to think or to apply knowledge enhanced, by presenting students with exercises relevant to materials quoted in the examination itself. The exercises may be of the multiple-choice or classification types. In the social studies one paragraph may be an argument in support of the open shop, the other an argument

supporting the closed shop. The items may be classified "A if the first speaker would agree, B if the second speaker would agree, C if both would agree, and D if neither would agree." The items may include "The closed shop gives a union monopoly power; The open shop is more democratic in that it does not limit the right of the individual to work; and All workers benefit by collective bargaining, not merely the workers who are members of the union." In many fields, including the social sciences, the material quoted may constitute a presentation of data in the context of one or more paragraphs or in a chart or graph. The categories used in the classification of items may be:

Forming your judgments only in terms of the data given above, classify each of the following items by writing the letter

A if the item is *definitely* true.
B if the item is *probably* true.
C if the item is *definitely* false.
D if the item is *probably* false.
E if the data given are not sufficient to indicate any degree of truth or falsity in the item.

Such exercises may be scored not only to determine the general accuracy of the students in interpreting data, but also to identify students who have tendencies to go beyond the data, to be over-cautious in interpreting data, and to accept data as supporting value judgments where, in fact, they do not. It was mentioned earlier that practice should be given in interpreting data before such exercises can legitimately be used.[3]

In discussing essay exercises mention was made of the possibility of reading student responses to gain insights with respect to attitudes and values. Some progress has also been made with respect to the use of objective instruments for this purpose. For example, in the Eight Year Study of the Progressive Education Association one of the evaluation devices was the "Scale of Beliefs"[4] which consisted of certain statements to be classified "A" if the student agreed, "D" if the student disagreed, and "U" if the student was uncertain. A few of the items may be listed:

Complete freedom of speech should be given to all groups and all individuals regardless of how radical their political views are.

[3] For more extended treatment of exercises of this type and also of other types of objective exercises, see:
Max D. Engelhart, "Suggestions for Writing Exercises to be Used in Tests Scored on the Electric Scoring Machine," *Educational and Psychological Measurement*, 7:357-374, Autumn, 1947. (The exercises described can also be scored by hand.)
Eugene R. Smith, Ralph W. Tyler, and the Evaluation Staff. *Appraising and Recording Student Progress*. New York: Harper and Bros., 1942, p. 550.

[4] Smith and Tyler, *op. cit.*, pp. 209-229.

Public regulation of business and industry is necessary in order to protect the interests of the general public.
Strict immigration laws should be passed so as to keep America for Americans only.

The scale yields a "liberal" score, a "conservative" score, and an "uncertainty" score for the scale as a whole. One can also obtain similar scores for the groups of items relevant to "democracy," "economic relationships," "labor and unemployment," "nationalism," "race," and "militarism." The magnitude of the uncertainty score is an index of strength of convictions. In a more recent scale, two types of uncertainty scores were obtained—"warranted" uncertainty and "unwarranted" uncertainty.[5] The student should be uncertain with respect to such a statement as "Young people today do not have as good morals as their parents had." In addition to obtaining the scores referred to above, it is valuable to secure counts for each item of the numbers or per cents of students who agree, who disagree, and who are uncertain. Such analyses of the responses to attitude scales given at the beginning and end of a course can be very useful in evaluating what changes in attitudes and beliefs have resulted from instruction. The scores or analyses should not be factors in determining course marks if students are to feel free to give honest answers. Similar instruments can be devised for use in fields other than the social studies, for example, a scale of health attitudes in biological science or a scale of attitudes toward various types of art in a course in art appreciation.

The author has made a number of suggestions with respect to evaluation of the attainment of a variety of objectives. Improvement of instruction and improvement of evaluation have a reciprocal relationship, each depending upon the other. Given adequate definition of objectives and instruction guided by them, adequate evaluation is facilitated. Given effort to improve evaluation as suggested above leads to further improvement of instruction, since teachers obtain the data necessary for more effective guidance of the learning activities of individual students.

[5] Albert William Levi. *General Education in the Social Studies.* Washington: American Council on Education, 1948, p. 336.

Marking Pupils

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"TO MARK or not to mark," Is that the question? No! The question is, rather, "How to mark?" Some of those interested in education have urged that verbal descriptive statements concerning pupils and their achievements be employed in place of marks. Such statements are good, are needed; they serve a useful purpose. It is, however, not a case of "either . . . or," but rather of "both . . . and." Marks and verbal statements supplement each other. Each has its values and uses, also its limitations.

In a very different culture than ours, with an educational system patterned quite otherwise than ours, marks might not serve a sufficiently valuable purpose to justify their use, but in the present and probable near future they do. A system of stating pupils' achievements in relatively brief and commonly understood terms is helpful to pupils, teachers and others concerned. Such a system often needs to be amplified by verbal descriptions, but just as a pupil's actual height and weight constitute the starting point in consideration of his being over-weight or under-weight, but should be supplemented by a description of his physique and development, so it is in the case of his school achievement.

Upon what should marks be based? What should they represent? If a school has but a single system of marks, their basis should be actual achievement or mastery of subject matter by its pupils. Such factors as effort, interest, attitude, intelligence, personality, and general conduct should not be considered in determining such marks, but do need to be considered in interpreting marks and dealing with pupils, just as do age, sex, and other physiological factors in connection with weight. Indeed, the writer would like to see every school mark, or rate, its pupils upon a number of such points, also adding verbal comments and elaborations.

An important feature of marking systems is uniformity. With a large fraction of pupils moving from school to school and system to system and all, of course, from teacher to teacher, marks should be so expressed as to have the same meaning to all. Not only are principals and others who must interpret marks of pupils who change schools caused much unnecessary difficulty if this condition

does not hold, but teachers, pupils, and parents are also. If Mr. Brown's B denotes the same level of achievement as Miss Smith's C, misunderstandings and false interpretations occur. The writer believes that it would be highly desirable to adopt a uniform set of marking symbols just as we have uniform systems of measuring money and weight, for example. Furthermore he believes that quantity and quality of expected achievement should be so controlled that it requires the same amount of time and effort on the part of average pupils to earn the same mark in one subject as in another. In other words, he does not believe there are great intrinsic differences in the difficulties of various school subjects, but that such differences are chiefly caused by variations in amounts, teaching methods, and goals.

All available relevant evidence should be employed in determining marks. Short and long tests, oral work in class, special projects, laboratory and shop performances, and whatever else teachers observe or learn that indicates degree of pupil accomplishment should be considered. There should be no provision requiring that in all subjects, or even in all courses in any one subject, a fixed percent of a final mark depend upon short tests, another fixed percent upon individual projects, another upon final examination, and so on. The weight given each should vary in harmony with objectives and teaching methods.

Since there is ample evidence that even good, experienced teachers cannot reliably discriminate among more than a few degrees of achievement, a marking system should have only a few symbols. Largely because it is so generally understood, a system of symbols beginning with *A* as the highest mark and employing immediately succeeding letters of the alphabet has much in its favor. Six marks, with *A, B, C,* and *D* being passing and *E* and *F* failing, constitute a good system. *C* is the average mark, *E* a high failure, that is, one not far below passing. The use of + and − with these transforms the system into one of eighteen symbols, which is quite undesirable. Perhaps an occasional *A*+ for a pupil whose work is almost perfect and a *D*— for one who just "got by" are desirable, but even these are doubtful.

Letter symbols should not, as is too often the case, be defined in terms of percents. Instead, two types of definitions may well be used. One is in terms of percent of pupils expected, in the long run, to receive each letter; the other by means of verbal statements relating the several letters to corresponding degrees of accomplishment of objectives. Portions of these may be quite general, for

many or all courses; others specific, pertaining to only one course or a small group of closely related ones.

What should be the distribution of marks? Should it be normal, as has often been advocated, skew, or any other fixed shape? This question has stimulated some very emphatic argument, probably more than any other point connected with marking.

The present writer believes that it is reasonable to expect an approximately normal distribution of marks for all pupils in all courses, or even in all classes taught by a single teacher, but not in each course or class. Too many factors which prevent a small group of pupils from being typical of all may enter the situation. He suggests that an ideal normal distribution, such as *A*'s—7%, *B*'s—24%, *C*'s—38%, *D*'s—24%, *E*'s and *F*'s—7%, be kept in mind as a general guide only. For single classes or courses limits may be set, limits not to be exceeded unless for good reason and with the concurrence of another person, such as a department head or a principal, with the teacher concerned. For the distribution given above, limits may well be something like: *A*'s—0 to 15%, *B*'s—15 to 30%, *C*'s—30 to 50%, *D*'s—15 to 30%, *E*'s and *F*'s—0 to 15%.

One of the best ways to determine the marks of individual pupils is by the use of the z— or standard score technique. This requires computation of the mean and the standard deviation. Similar methods employing the median deviation instead of the standard deviation, and the median and quartile deviation instead of the mean and standard deviation, may also be employed, but are much less common.

To employ such a procedure, one must first decide what distribution is considered appropriate for the group of pupils concerned and then determine the points, in terms of their deviation distances from the mean, or median, which divide the whole distribution into the desired parts. The mean, or median, of the group in question is assumed to be the same as that of the distribution postulated as appropriate and the score of each pupil is transmuted into a letter according to where it falls with regard to the division points just referred to. The effect of doing this is to leave the shape of the distribution of letters the same as that of the numerical scores from which they were derived, not to force it into a normal or other supposedly ideal shape.

The z— score procedure will be illustrated by an example. Let us suppose that a class of 24 pupils have the following scores which are to be turned into marks: 370, 362, 357, 355, 330, 321, 316, 303, 303, 302, 289, 285, 263, 260, 250, 236, 229, 226, 222, 221, 219, 202, 191, 188. Their mean (M) is 275.00 and their standard

deviation (σ) 55.89. Suppose further that the 7,24,38,24,7 distribution is considered appropriate for this group. By reference to a table giving areas and deviations of the normal curve it can easily be seen that the top 7% of the area are above the point $M + 1.5\sigma$, the next 24% are between that and $M + .5\sigma$, the middle 38% between $M + .5\sigma$ and $M - .5\sigma$, the next 24% between the latter and $M - 1.5\sigma$, and the lowest 7% below $M - 1.5\sigma$. The four needed division points are found, thus:

$$M + 1.5\sigma = 275.00 + 1.5 \times 55.89 = 358.84$$
$$M + .5\sigma = 275.00 + .5 \times 55.89 = 302.95$$
$$M - .5\sigma = 275.00 - .5 \times 55.89 = 247.06$$
$$M - 1.5\sigma = 275.00 - 1.5 \times 55.89 = 191.17$$

The two scores above 358.84 become *A*'s; the seven between that and 302.95 *B*'s; the six from that down to 247.06 *C*'s; the seven below that but above 191.17 *D*'s; the two below 191.17 both *E*'s, since neither is far enough below to be an *F*. This distribution, it should be noted, is not normal, even though the normal was postulated as the ideal.

If it were felt that this class should receive a distribution somewhat above normal, one such as *A*'s—10%, *B*'s—30%, *C*'s—40%, *D*'s—15%, *E*'s and *F*'s—5%, might be considered desirable. The division points for it are $M + 1.28\sigma$, $M + .25\sigma$, $M - .84\sigma$, and $M - 1.64\sigma$, which give 346.54, 288.97, 228.05, and 183.34, respectively. Using these points results in 4 *A*'s, 7 *B*'s, 6 *C*'s, 7 *D*'s, and no *E*'s or *F*'s, a distribution which also does not conform to the ideal chosen.

If the reader is thinking that all this is too much work, let him consider two facts. In the first place, it need be done only when reports giving marks are to be issued. In the second, the arithmetic involved is certainly no more difficult than some of that, such as cube roots and partial payments, commonly taught in the seventh and eighth grades when persons as old as the writer were in school.

Because of the limitations of space, this discussion has had to be rather dogmatic. Much fuller justifications of the points of view presented can be found in literature dealing with the topic.

Teaching Reading at the High School Level

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THERE has been a tendency among high school teachers to consider the teaching of reading as the obligation of the elementary school. High School freshmen were supposed to be able to read the materials encountered in their courses and, if they were not, the high school accepted no responsibility for the deficiency. Needless to say, there were numerous freshmen who could not read satisfactorily at the high school level, and they found themselves in a no-man's-land where help was plainly needed but where there was no one to accept the responsibility for providing such help. In such a situation the first need is to assess the relative obligations of the elementary school and the high school for the teaching of reading. This should result in a clear-cut definition of the responsibilities of each.

The obligation of the elementary school can be expressed in precise terms. If it does the job well, a pupil at the completion of elementary education should be able to read with the same proficiency as do adults provided (a) that the vocabulary in the materials they read is at their level of maturity and (b) that the ideas and concepts presented are within their range of information and understanding. Where these two conditions are met, a graduate of the elementary school should be able to read as rapidly and with as satisfactory comprehension as do adults. The elementary school has not completed its obligation until this level of competence in reading has been reached.

The task outlined in the preceding paragraph imposes no hardship on the elementary school. The vocabulary load for general, non-specialized reading is not large. For example, in Van Loon's "Story of Mankind" over 95 per cent of the words (excluding proper names) are in the first 4,000 of the Thorndike Word List. Elementary school children should become so familiar with the common vocabulary of our language that they can read with complete fluency. When this common vocabulary is employed to express ideas within the range of the child's experience, the elementary school graduate should be able to read with full comprehension and at a rate of approximately 300 words per minute.

High school teachers have a right to expect this degree of proficiency in reading of entering freshmen.

However, the reading requirements of the high school go quite beyond those of the elementary school. Certainly the high school can not expect elementary school graduates to be familiar with the specialized vocabularies of mathematics, science, social studies, and vocational fields. If pupils are to read in these areas, they have a right to systematic teaching of the enlarged vocabularies required. High school teachers have been trained in specialized courses in college and high school textbooks are often written by college teachers who have no awareness of the limitations in vocabulary of the pupils for whom they write. The result is that the textbooks present a heavy load of new and specialized terms and high school teachers, who of course are familiar with the terminology, fail to realize that they have a special obligation to teach their specialized vocabularies just as elementary teachers must teach the general common vocabulary of our language. Most high school teachers do not even know the vocabulary load of the books that they teach.

Just as education at the high school level embodies a heavy load of new and specialized words, it also imposes a heavy load of new and specialized ideas and concepts. Since these ideas are familiar to the teachers, it is easy for them to fail to notice the difficulties that they present to the pupils. High school pupils are not lacking in intelligence; they are, in fact, a somewhat select group. But no one, regardless of how intelligent, can read if he is not familiar with the vocabulary and the basic concepts of the materials read. If one has doubt of this, let the English teacher try to read the professional journals of the physics teacher or of the shop teacher, and he will soon realize the obstructions that are caused by lack of specialized vocabulary and by lack of technical concepts.

The task of the high school in the teaching of reading thus becomes clear. It is a two-fold task.

One part of the high school's task is to provide remedial instruction for freshmen who enter without having accomplished the expected goals of the elementary school. This will be a considerable group of pupils and if their deficiencies are not remedied promptly, they will become the slow readers and the mind-wanderers who cause trouble throughout their high school career. The objective of the remedial teacher should be explicitly to reach the goal of being able to read proficiently materials of non-specialized content and written in the range of the pupil's general

vocabulary. This means the development of basic perceptual habits, increased familiarity with the common words of the language, the development of an attitude of purpose in reading, and the elimination of subvocalization in silent reading. Remedial clinics have now developed effective techniques for accomplishing these aims and a high school that is serious enough to employ competent remedial teachers and provide the necessary materials for such work can expect a marked degree of success. This is not a job for just any high school teacher who happens to have good intentions and some free time; it is a job requiring expertness and specialized preparation.

The second part of the high school's job is to provide a developmental reading program. This must be sufficiently broad and flexible to meet the varied kinds of situations that are found at this level of education. The basic factors in such a program are those already mentioned, namely, definite provision for teaching the specialized terminology of high school courses, and instruction that makes clear the new concepts and ideas that are fundamental to the subject matter fields encountered in high school. If a reading program is to be effective, it must be based on definite knowledge, rather than general impressions. For example, a teacher of physics, or European history, or geometry should know by actual word-count, the vocabulary load of the books that he expects his pupils to use. If the first chapter, or a sample of pages therefrom, were analyzed according to the Thorndike Word List, the teacher would then know what per cent of the words are in the common vocabulary that pupils already know and what words are beyond that vocabulary level. Of the words beyond the common vocabulary, he can then separate those that are general terms, common to all high school courses but at a higher level than the elementary school vocabulary, and those that are specialized for the particular course that is being studied. Specialized technical terms should be explained before the pupil reads the assignment containing them. Difficult general terms can be noted and pupils can be helped to enlarge their general vocabulary. Likewise, proficiency in reading at the high school level requires general understandings of the ideas covered in the assignments. Sometimes poor reading by students reflects poor teaching that has failed to clarify the concepts and ideas covered by the reading materials.

Beyond this basic job of providing for growth in vocabulary and concepts is a multiplicity of specialized teachings to cover a great variety of reading problems. The reading of maps, diagrams, graphs, statistical tables, blueprints, and shop drawings

each presents a specialized symbolism to be learned. Some of these symbols are non-verbal, such as symbols on a map or a blueprint, but they convey ideas and they must be learned. Teaching one to read them requires carefully planned instruction that is quite different from the incidental and casual treatment in which these matters are usually handled.

The high school has a right to expect a competent job of reading instruction by the elementary school covering general vocabulary and providing effective techniques for general reading at the elementary level. Beyond this is a large area of reading instruction that is the exclusive obligation of the high school. It is a cooperative obligation of the entire faculty, but it should rest on a clear conception of a reading program with provision for specialized remedial work plus definite assignment of obligations to each member of the faculty for attention to necessary reading instruction in each subject field.

Provision for Slow-Learners in High School

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SLOW-LEARNING pupils have been entering high schools in increasing numbers. According to one study made more than ten years ago, practically all the junior high school pupils planned to go to senior high school regardless of their mental ability. The slow-learners have been considered a nuisance rather than an opportunity by many high school teachers who have been accustomed to teach more able pupils. Consequently many of these pupils have failed and dropped out of school at the end of the freshman year. These are the children whose intelligence quotients fall roughly between 75 and 90. These "borderline" cases constitute a fairly large proportion—approximately 17 per cent—of the child population.

POTENTIALITIES OF SLOW-LEARNERS

These boys and girls have potentialities. Slow-learning children continue to develop intellectually during high school years. Moreover, some children from the lower socio-economic groups do not overcome the handicap of an intellectually unstimulating home environment until they reach high school. By that time their school experiences have supplied stimuli to mental development which they had previously lacked. With increasing evidence that slow-learning children have not stopped learning at the end of elementary school, the need for providing suitable education for them during high school years is clearly indicated.

THE HIGH SCHOOL'S RESPONSIBILITY

It is the school's responsibility to help them to develop in their own best way. To do this, the school must provide a series of worthwhile experiences suited to them. This has been done in many elementary schools through special classes. In these classes, they have learned from direct experience and have felt successful. They no longer think of themselves as hopelessly slow or dull.

The difficulty comes when slow-learning children, who have been in special classes in elementary school where the materials

and methods of instruction have been adapted to their ability to learn, are turned loose in high schools quite unsuited to them.

In the large majority of high schools no special provision has been made for the slow-learning pupils. The situation in New York City a few years ago is typical. Miller[1] made a follow-up study of pupils who had been in a special class at the Speyer School for children with IQ's from 75 to 90.

AN INDIVIDUAL CASE

A brief account of one of these pupils will illustrate some of the slow-learner's problems of adjustment, even in a vocational high school: Rafael was 15 years 7 months old at the time of the follow-up study. He had a Binet IQ of 86 and a mental age of 13 years 5 months. His reading level was almost sixth grade and his arithmetic, almost fifth grade. From the special class in elementary school he had gone to a vocational high school. He was in school only about half the time. Sometimes he would use his carfare to go to the movies. He was dissatisfied with the shopwork he was taking—sheet metal work—and wanted to try something different. The shop teacher knew little about him, and said he had done poor work and was present just enough to "get by." Rafael showed no particular aptitude for this work, was indifferent, and just did not seem to care.

At the end of the semester he was given a passing mark in auto mechanics and health education, but failed in his related academic work. Rafael said he wanted to go into aviation and could see no connection between the sheet metal or the auto mechanics training and possible later work as an aviator. Most of all he wanted to leave school and go to work. He had been working part time with a milkman. He had been promised a regular job, but this job did not materialize. He could not get working papers for continuing with the milkman because it was night work. He could find nothing else to do. He considered joining a C.C.C. camp "for a change" and in order to get away from the city "where he could get into trouble." He applied but found there were many ahead of him. He had not been to the Junior Employment Service but was planning to register there. Rafael, like the other boys from the special class, felt more or less lost in high school. Guidance was almost entirely lacking. The careful and full records of the boy's interests, potentialities and behavior, which had been sent from the elementary school, apparently were not used by anyone on the high school staff.

[1] Jessica Miller. *The Slow-Learner on the Threshold of the Secondary School.* Unpublished Project Report. Teachers College, Columbia University, 1941.

This case illustrates the major problems of the slow-learners who enter high school: the lack of orientation and guidance, the high academic standards even in the vocational high school, the difficulty of obtaining a job without training, the neglect of education for leisure and family living. Slow-learning pupils are still forced into high school courses, which, even though greatly modified, are still beyond their grasp. They are too often encouraged to strive for educational and vocational goals beyond their reach.

THREE TYPES OF PROVISION FOR THE SLOW-LEARNER

Three main types of provision may be made for slow-learners in high school: (1) adaptation of the regular high school curriculum and instruction to individual needs, (2) special classes in different subject fields, and (3) special classes and schools for slow-learners as a group. In the first plan the attempt is made to educate an extremely heterogeneous student body. The teacher-counselor studies each pupil's abilities and interests, and helps him to plan a program that meets his needs. The subject teacher provides a wide range of experiences in his class. For example, the social studies teacher has a class library that ranges in reading difficulty from second-grade level to superior adult.[2] By providing projects requiring both mechanical and verbal ability, by differentiation of assignments, by forming subgroups within a class, the gifted teacher, supplied with a wide variety of materials of instruction, can meet the needs of all the pupils in his class.

The second plan is to have a core group of pupils having widely different abilities who meet together for instruction in social living, music, physical education, and other common learnings which all should have. In addition, there are special classes for pupils of different interests and abilities. For example, a special English class could be planned for pupils like Rafael who cannot read Shakespeare but can read and write about subjects that are of vital interest to them. There is, for example, a great need for simply written books about vocations that slow-learning pupils can enter successfully.

The third plan is to set up a special class or special school for slow-learners of high school age. For example, in Charlotte, North Carolina, a special class for slow-learning children ten to sixteen years of age with IQ's below 80 was organized with the help of the Junior Chamber of Commerce. The room was located in a junior high school building. The main features of this class were (1)

[2] For books for slow-learning pupils see Helen Carpenter, *Gateways to American History*. New York: H. W. Wilson Company, 1944; and Ruth Strang *et al.*, *Gateways to Readable Books*. New York: H. W. Wilson Company, 1945.

an initial physical examination, Stanford-Binet test, and interviews with psychiatrist and with teacher; (2) close cooperation with parents; (3) experiences that would help children participate in their daily activities such as coming to school safely; and (4) opportunities for developing ability to get along with others and to finish tasks that are suitable for them. There was no other provision in the school system for these children. Having demonstrated its value, the class was made a part of the regular school program and used as a center of observation by the State Department of Education.[3]

Of these three plans, the second seems to be the most feasible at present. It provides association with pupils of varied interests and abilities, common learnings, and the special instruction needed by slow-learners. New York City[4] is planning to make provision for slow-learners in the near future following a period of experimentation. The special schools and classes serve an important purpose as experimental centers for developing materials and methods appropriate to slow-learners and as training centers for teachers who want to meet more adequately the needs of this large number of pupils now in high school.

[3] Mary Maude Birmingham, "Organizing a Special Class for Slow-Learning Children," *Understanding the Child*, XVIII (October 1949), 114-116.

[4] Leo Wentz, chairman, "The Social Studies and the Slow-Learner." *High Points*, XXXI (September, 1949), 13-26.

Provision for Atypical Children in the High School

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WHICH *children are atypical?* It has often been said, with good reason, that there is no typical child. Every child is unique in some way from every other child. No two children ever have exactly the same backgrounds of experience, and only in the case of identical twins, triplets, quadruplets, or quintuplets do any two children ever have equivalent hereditary characteristics. Furthermore, the usual pattern of abilities for any given child is uneven. It is a rare child, indeed, who is equally good at everything. These facts seem to indicate that schools should make modifications and special provisions for all children if the needs of children are to be met. There are, however, in every school some children who deviate so far from the general run of their classmates that drastic modifications must be made if the children are to be at all well adjusted to the curriculums which are offered. There are, for example, high school pupils who are nonreaders or who read at first or second grade levels; there are pupils who have marked difficulties with mathematics, spelling, or handwriting.[1] On the other hand, there are pupils who are so superior in their performances in these and other fields that the curriculums may seem to offer them little that is of real challenge.

The present discussion will concern itself with the provisions high schools are making or should make for pupils who deviate greatly from the norm in their ability to perform scholastically. Attention will be given both to slow learners and to rapid learners, although the major part of the discussion will center about the former.

PROVIDING FOR THE SLOW LEARNING PUPIL

Pupils are slow learners for a variety of reasons. Three major causes which stand out clearly are (1) low general intelligence or learning ability, (2) insufficient background of experiences in the area being studied, and (3) lack of motivation. I should like to

[1] See G. M. Blair. *Diagnostic and Remedial Teaching in Secondary Schools*, New York, The Macmillan Company, 1946.
This book describes methods and materials to be used with such pupils.

discuss briefly methods of dealing with slow learners who fall in each of these categories.

Dealing with pupils of low general intelligence. High schools in general either have special classes for such pupils or attempt to meet their needs in regular classes. Much argument has raged over the subject of which method is better. I do not believe a definite answer can be given to this question in the absence of a description of what actually takes place in these two teaching situations. Depending upon how they are handled, either of these methods might produce superior results in terms of meeting pupil needs. In teaching the student with general low academic aptitude, one should follow certain basic principles. Three principles of major importance are (1) the pupil must not be humiliated or be made to feel inferior to other pupils, (2) the work must be geared to the level at which the pupil can successfully perform, (3) the work must directly tie-up with the pupil's interests and goals.

Some special-class teachers are able to create an atmosphere which makes their pupils feel important and significant and not inferior to other pupils. The pupils are made to feel that they are perfectly normal in every respect, that every individual is good in some things and not so good in other things. If it is a special class in reading, the teacher conveys the idea that anyone can learn to read just like anyone can learn to tap dance or play the piccolo. The teacher might cite cases of famous men such as President Andrew Johnson who did not learn to read until after he was married. If the pupil is really made to believe that there is nothing peculiar about him, he will generally be enthusiastic about improving his reading skills even if the lessons are conducted in a class especially designated for that purpose. On the other hand, if teachers and school administrators tend to regard special classes for poor readers as essentially "dumb-bell" classes, the pupils quickly sense this and very unsatisfactory results are bound to occur. Under such circumstance, slow-learning pupils would probably be better off in regular classes. Just how well off such pupils would be would depend upon the attitudes and techniques of the regular class teacher. Regular class teachers can humiliate slow-learning pupils just as well as can special class teachers. The presence of rapid learners in the regular classes also may serve to create accentuated feelings of inferiority in the slower learners. Pupils placed in special classes for slow learners frequently find for the first time in their lives that they can be successful in learning school work, and this fact inevitably has a most wholesome effect upon their personalities provided no stigmas are attached to the special classes.

Master teachers in regular classes who follow the three basic principles stated in the previous paragraph also have been able to produce entirely satisfactory results with pupils of low academic aptitude.

Dealing with pupils who have meagre backgrounds of experience. Some pupils do very unsatisfactory work in a certain school subject because they have an insufficient background of experience in the field being studied. It is known, for example, that a pupil may be an excellent reader in the field of history, but may fail miserably in his ability to comprehend materials in the field of chemistry, and vice versa. Readiness in terms of experience backgrounds is necessary for successful performance in any of the high school subjects. Some pupils fail algebra because they do not have a sufficiently sound knowledge of arithmetic. Some pupils have great difficulty with high school physics because their algebra is weak. Such individuals are often considered to be slow learners, but their slow learning is not due to lack of general ability but to weakness in previous preparation or general impoverished environment. Children from underprivileged sections of the country or underprivileged racial or social groups often have great difficulty with school work because their experiential backgrounds have not been of the type to make it possible for them to get much meaning from their school experiences. This type of defect in pupils is difficult to remedy. There are two things, however, which can be done by schools to improve the lot of such pupils. They are as follows: (1) study each pupil to see what his previous preparation or background of experiences have been and then gear the learning exercises to his state of readiness, (2) provide such pupils with many new experiences to build up his background. School excursions, visits to various social institutions and agencies, as well as appropriate reading materials may serve to partially fill gaps in experience backgrounds.

Motivating the slow learner. Many high school pupils do ineffective work in their classes chiefly because they lack motivation for the tasks at hand. Many of these individuals are labeled slow-learners by their teachers. They actually are slow learners as judged by the quality of their performance. Such pupils usually dislike the subject or subjects they are studying. How does a teacher go about getting a pupil who hates a particular subject to like it? E. L. Thorndike has suggested that the way to do this is to follow the fundamental rule of "practice with satisfaction." If a pupil receives pleasure in connection with his study of a school subject, he will gradually develop a liking for it. Whenever an annoying

activity is imbedded in a very strong satisfying context, says Thorndike, there is a tendency for the annoying activity to lose its distastefulness and take on the satisfying qualities of the context of which it is a part. If the pupil is successful in his efforts to learn a subject, if he is made to feel important and to have status, if a feeling of accomplishment accompanies the work, it is inevitable that the activity will come to be enjoyed rather than disliked.

The psychologist Kurt Lewin would have stated the solution to the problem in slightly different terms. He would have said if you want to get a pupil who hates to read, for example, to like to read, the thing to do is to place reading between the pupil and his goal. People always go to the goals they have set for themselves. Pupils in high school of all levels of ability have interests and goals. Find out what these are, and then show the pupil how the mastery of the particular school subject or activity lies between him and the attainment of the goals he has in mind. There must, of course, be a real and direct connection between what is being studied and goals of pupils or it will be impossible to get motivation through this approach. When subject-matter is unrelated to the life needs of pupils, the only method of motivation available is that of coercion or threat of punishment. Such methods are usually ineffective in motivating the slow learner.

PROVIDING FOR THE ACADEMICALLY SUPERIOR PUPIL

The pupil who has outstanding academic ability and drive is often not given an opportunity in some high schools to achieve or perform at the level of which he is capable. Too often he has to routinely perform tasks which he has mastered years before. The outstanding student needs library and laboratory facilities of a greatly enriched and expanded nature. He often can be given a great deal of responsibility for carrying out projects without a great deal of close supervision. It is not necessary to use intelligence tests to identify such pupils. The teachers know who they are. Their performance speaks for itself. The master teacher can handle such individuals through manipulating the activities of the regular class. Just as slow-learning pupils should never be referred to as "dumb," the outstanding academic performers should not be referred to as "gifted." They should be thought of as perfectly normal individuals who have a particular flair and talent for academic pursuits. In other respects they may be average or below average. The talents they have, however, should be cultivated to as great a degree as possible as society is greatly in need of the special competencies they have to offer.

SUMMARY

Every pupil is atypical in some respect. Hence, the curricula of high schools should be sufficiently flexible to provide modifications of greater or less degree for all pupils. Especial attention, however, must be given to extremely slow learners if their needs are to be met. The greatest care must be exercised in planning programs which insure that they are not made to feel inferior to other pupils, that the program of studies is geared to their level of abilities, and that the school work relates to their interests and purposes. Pupils who are academically superior also need curricular modifications which permit them to work at advanced levels and to carry forward projects in accordance with their interests and abilities. Society cannot afford to lose the unique contributions of any of its members.

Statistical Understandings Every Teacher Needs*

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ALMOST anyone who is enthusiastic about a particular kind of subject matter can advance convincing arguments concerning the advantages which would accrue to the entire civilized world if teachers were required to understand that subject. And he is usually right. The only hitch is our inability to find enough teachers or prospective teachers who have the mental energy and physical stamina requisite for being at one time scholars in the subjects they teach, experts in child psychology and guidance, skilled teachers of reading able to give remedial help in whatever field they may be teaching, individuals well-versed enough in health education to lead their charges into good health habits, participants in public affairs with insight into the meaning of political and economic forces, participants in professional activities and teachers' organizations, devotees of the arts who, by introducing their pupils to beauty, can contribute to the enrichment of their personal lives, well-read men and women who have at least a nodding acquaintance with modern science and the social studies, and who above all this are gracious, happy, relaxed, friendly persons sufficiently unhurried to create an atmosphere in which children can live and develop normally. Doubtless everyone will agree that it is far easier to show *why* a teacher needs to know some particular thing than to show *what* can be eliminated from his course of study in order to make room for it.

I do not intend to tell you that every teacher needs to be a statistician, no matter how idyllic such a situation might seem to me. Rather, I have tried to take account of the multiplying demands upon today's teachers and to ask myself what is the least they can afford to know about the statistical way of thinking; what ideas, primarily statistical in nature, are essential to competent living in the modern world, to competent thinking about that world, to competent discharge of the functions of a citizen therein? The present discussion takes no account of the needs of the teacher who

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is doing research work, or who becomes a college teacher of education, or who undertakes to read widely in the research literature of a special field. It relates only to the general needs of the ordinary classroom teacher as he deals with pupils and meets his responsibilities as as an educated citizen.

To a very striking degree our culture has become a statistical culture. Even the dullest person who may never have heard of an index number is affected in intimate fashion by the gyrations of those index numbers which describe the cost of living. Even on the most elementary level it is impossible to understand psychology, sociology, economics, finance, or the physical sciences without some general idea of the meaning of an average, of variation, of concomitance, of sampling, of how to interpret charts and tables. The deliberations of Congress and the state legislatures deal continually with matters in which it is impossible to reach a sound decision without weighing statistical evidence. Perhaps the clearest indication of the extent to which statistical ideas pervade modern life is the use made of such ideas by advertisers. Quoting statistics in favor of almost any product they wish to popularize, making liberal use of graphs, they tacitly assume that the American people are accustomed to thinking in statistical terms, or that if they do not understand they will at least consider a statistical argument incontrovertible.

Individuals who do not feel confident of their own ability to interpret a statistical statement usually resort to one of two extreme patterns, each unsatisfactory to the well-educated man. One of these extremes is the uncritical acceptance of any statement buttressed by numerical data, however fantastic. The other extreme is uncritical suspicion of *all* statistical reasoning. Between these two, the only alternatives would seem to be either dependence upon authority or some comprehension of what statistical reasoning is and on what principles it depends for validity and cogency. One usually cannot depend upon having a satisfactory authority at hand, however, and the person who would make judicious decisions in regard to personal conduct and to public policy will frequently need to base those decisions on information essentially statistical in nature. The conclusion seems inescapable that some aspects of statistical thinking which were once assumed to belong in rather specialized technical courses must now be considered part of general cultural education.

To provide such general cultural education will require undergraduate courses in which applications are made to the whole range of human affairs and in which emphasis is on concepts, logic,

sources of data, interpretation, avoidance of common fallacies. The development of such courses in the first two years of the liberal arts college has been recommended by four independent committees which made public their reports during the year 1947. These various committees were appointed by the National Research Council, the Institute of Mathematical Statistics, the Inter-American Statistical Institute, and the Royal Statistical Society of London. The membership of the four committees did not overlap and their very similar conclusions were reached independently.

To implement the findings of these committees, experimental work on the development of a general undergraduate cultural course in statistical methods has already been begun under auspices which augur well for its success and popularity. But if such a course is needed in the liberal arts college to provide a background essential for work in the social and physical sciences, to serve the future legislator and business man and housewife and agriculturalist and lawyer and physician, it is even more urgently needed in the teachers college. There are serious problems connected with finding teachers for such courses in either the liberal arts or the teachers college, but these are not the main interest in this discussion. Rather, attention is directed to the goals of such instruction, without delaying too long over its obvious difficulties.

Perhaps the most important thing educated persons—including teachers—need to know about statistical method is the uses which can be made of it. Such a course should help the student to find many new interests, to become curious about new problems for which he discovers there is a statistical key.

The ability to read simple graphs and tables is now so widely accepted as an essential part of general education that we need not discuss it extensively. Whereas it is now taught in the mathematics classes of almost every junior high school, twenty-five years ago it was considered technical and beyond the scope of high school work. It is doubtful, however, if even now the teachers who are not mathematics teachers receive enough instruction in this area to make such simple charts as might make their own teaching more vivid. Many teachers still skip all tables and charts in their own professional reading. Here is one of the basic communication skills which teachers especially need.

As to the nature of statistical thinking, educated persons—including teachers—need to know certain things. (1) Statistical method is a sort of telescope which enables one to survey a larger area than can be seen by the naked eye, to comprehend more facts

than can be apprehended by direct and personal experience. (2) A statistical statement applies in general to a group but not necessarily to a particular selected individual in that group. (3) Understanding and interpreting a set of data require much more than just making the appropriate computations. Computation is only a step in the logical process. No amount of elaborate calculation can take the place of careful initial thinking about a problem. It is not sensible to make an elaborate analysis of meaningless data. (4) Any generalization to a larger group of an observation made on a smaller group is statistical in nature. A large part of our thinking about the world is of this kind, vague perhaps and often slipshod, yet essentially statistical. There are certain controls which must be exercised over such thinking if it is to be valid.

Educated persons, especially teachers, need some understanding of the universality of human variability. This important statistical concept is still widely and woefuly misunderstood. A norm on a test intended only as a description of central position is interpreted as a standard to which individuals must conform, whether or not conformity benefits them. Parents worry needlessly about whether their children are overweight or underweight, above or below average in any trait on which they can find a published norm. The person who knows only enough about statistical method to acquire an imposing vocabulary sometimes forgets the essential fact of variability and uses a norm like a Procrustean bed on which the lesser individuals are ruthlessly stretched and the giants are tragically amputated. Another related and common fallacy with bad social consequences is the assumption that when the mean of Group A is significantly greater than the mean of Group B, every individual in A is fairly certain to exceed every individual in B. Think of the vast possibilities for mischief inherent in that fallacy. I have heard a college professor of chemistry seriously propose to discourage women from studying chemistry and physics because of the well-known fact that when scores of women and men students in these subjects are compared the women almost always come out with a lower mean. A similar fallacy runs through the thinking of a great many otherwise educated people when they deal with social questions involving a comparison of the sexes, of two races, of two economic groups. If teachers themselves could become so familiar with overlapping frequency distributions that they could help high school students learn to avoid this particular piece of stupidity that would be a result of real social importance.

The approximate nature of all measurement is an important idea for educated people in general, but it is especially important

for teachers, who may do great harm to their pupils if they place too literal trust in unreliable measures of those pupils. The inescapable unreliability ot measurement can be made vivid even to relatively immature pupils if appropriate experiments are arranged. Over and above the needs of the average person, the teacher needs to have some idea of the meaning of the conventional measures of test reliability and of the qualities to be sought in selecting standardized tests, as well as of methods of determining the reliability of teacher-made instruments.

There is an inexhaustible supply of amusing illustrations of the ordinary person's misplaced faith in the precision of his measurements. The particular episode which has grown gray in my service at this point comes from the days when I taught a high school class in trigonometry. The students had been brought up in the tradition which makes a fetish of complete accuracy and I had spent most of one period trying to blast out their belief that it was a mark of merit to carry computations to a large number of decimal places. Finally, with a yardstick scaled only to the quarter inch I measured the length of a desk with well-worn edges and stated the result as 43.4672 inches. What was their appraisal? It took them no time at all to say I was either bluffing, joking, or hopelessly stupid. The very next morning in a school assembly the high school principal read the average grade of each member of the graduating class to four decimal places. As a device for reinforcing my teaching the experience was admirable, but I fear it did not enhance the prestige of the principal in the eyes of this class.

Concomitance is a ubiquitous phenomenon but one that is not ubiquitously understood. Anyone who listens attentively for a few hours to conversation on almost any serious subject among a group of college graduates innocent of statistical training can usually pick up a choice collection of fallacies. They confuse concomitance with causation and so propose irrelevant action. They assume that a positive relationship is a perfect relationship. They express surprise that where a high relationship exists some particular individual departs from the group trend. (This particular fallacy may cause a teacher to demand the impossible of her pupils.) They express concern because the offspring of brilliant parents are less brilliant than those parents. They think the child who has the highest intelligence quotient in his class should be expected to stand highest in most other desirable traits and should be censured if he does not excel. Even without the computation of a single coefficient of correlation, the underlying idea of regression could be made clear enough to correct this sort of fallacious thinking.

At the present time nearly every teacher knows a great deal that is not true about the normal curve and uses it in a pseudo-scientific fashion which does no good either to him or to his pupils. It would be a service to replace these erroneous beliefs with something less pretentious and more defensible.

Almost everyone who reads the newspapers is now familiar with the various opinion polls and so has some vague idea that the observation of a relatively small number of randomly selected individuals can in some mysterious way provide information about the characteristics of a vast population which has not been observed at all. This is an exciting idea. Even more surprising to most people is the fact that the sample can also be made to furnish information regarding the value of the population estimates made from its data. To most laymen this sounds like a bit of abracadabra. Yet is is of real practical importance that the layman understand something about the business of drawing samples and making inferences from samples. Few people get through a day without making some sort of decision based upon a sample. The cook samples a pudding to see whether it needs more sugar, the swimmer dips an exploratory toe into the water to sample it for temperature, the physician generalizes about the incidence of a particular malady from the patients he has examined, the parent uses his experience with one or two children as basis for general opinions regarding the probable effect of certain methods of discipline, the businessman tries to project his past experience into the future, the manufacturer examines samples of his product to see whether the process is satisfactory, the legislator must decide upon appropriations for making studies of unemployment, of agriculture, of cost of living, of the volume of retail sales (and when these studies are made he must understand their implications for further legislation), the teacher uses her accumulated experience with children to guide her in dealing with a new group of pupils, and everyone is continually trying to draw inferences about the behavior of other people from the limited and biased sample of people who have come under his personal observation. The educated person—especially the teacher—needs to become sensitive to sources of bias in any sample on which he is depending for information, needs to know that sampling has become a highly technical business, and that if he plans to make an important study utilizing sampling he must study the pertinent literature or consult an expert, preferably both.

It is an enlightening experience for the student to take part in the actual drawing of random samples from a known population,

to see the variability among the statistics, say the means, of these samples, to see a sampling distribution take form, and to learn the import of randomness and the relation of sample size to precision of estimate. After such an experience he is never quite the same, for he has discovered that while variation and uncertainty are universal, yet under the apparent confusion lies a measure of uniformity. There are relationships which dominate the swarming inconsistencies, there are limits beyond which the uncertainty does not pass. The student who has once caught the idea of what a sampling distribution is will ever afterward see a kind of ghostly distribution hovering behind any statistics which may be quoted. Told that a difference is thus and so he will always ask a mental question, "With how much margin more or less?"

Sir Charles Darwin, in his Presidential Address to the Mathematical and Physical Science Section of the British Association in 1938, expressed the hope "that generations will grow up which have a facility that few of us at present possess in thinking about the world in the way which the quantum theory has shown to be the true one. The inaccuracies and uncertainties of the world will be recognized as one of its essential features. Inaccuracy in the world will not be associated with inaccuracy of thought, and the result will be not only a more sensible view about the things of ordinary life, but ultimately, as I hope, a fuller and better understanding of the basis of natural philosophy."

JOURNAL FEATURES

Editorial

The Next Issue

The March-April issue of the *High School Journal* will be devoted to "The New High School Building." The editors believe that every teacher and principal should be able to help plan the new buildings which will be constructed in the next five years. We have tried to get the outstanding authorities in various phases of planning school housing to contribute to this number. Extra copies may be ordered in advance at the usual prices.

Fortune Survey

Elmo Roper's *Fortune Survey* on "Higher Education" which appeared in September is well worth the attention of those who are preparing students for college. It studies popular attitudes towards the functions and purposes of college education and the types of training through which the college best does its job.

Social studies teachers might well follow the same pattern within a given community in studying attitudes towards the program of the high school. The construction of questionnaires and study of the implications of the results would be well worth the time of either a high school faculty or a senior class or both.

Free Public Education

An article by E. C. Bolmeier in *Phi Delta Kappan* raises a very pertinent question as to the status of free public education. Numerous projects at the Masters and Doctors level have studied the costs of attending secondary school. They all bear out the fact that such education is seldom truly free.

The problem of fees is but a part of much larger question relative to the nature of American education. Is the American secondary school providing education for all without distinction as to social and economic status? A survey of the situation in North Carolina pointed out that even in the white schools but one in four of the students who start to school stay to graduate. Investigation as to the economic status of those who graduate will reveal that it is predominantly the children of the wealthier parents who have remained in the free public school. Differences in levels

of intelligence between one economic group and another (even if they were a valid criteria for determining educational need) would hardly account for the sharpness of the discrimination which seems indicated.

Doubtless teachers are not aware of the factors which are operative in determining that the child of the wealthier parent will stay in school longer than the child of the poorer parent. In some cases the question of the need for contribution to the family income may be responsible but this cannot be the only answer. It would be interesting to determine to what extent the marks of students staying in school served as an index to their economic status in the community.

It is at least possible that American secondary education with its historical background as an aristocratic bulwark both in Europe and in early American tradition is continuing to select rather than to educate. Not all of the blame should be placed on the subjects which are offered in the curriculum either. It is possible that such administrative devices as marks and reports to parents are also taking their toll.

Improvement of Reading

Of the many meetings held in connection with the March meeting of American Association of School Administrators the program of the International Council for the Improvement of Reading Instruction deserves the attention of teachers and principals. Scheduled are an address by Professor Emmett A. Betts and a panel participated in by Nila B. Smith, William S. Gray, Walter W. Cook, Gerald A. Yoakam, Sally Kate Mims, and Arthur J. Gates. The topic of the meeting is "Differentiated Instruction in Reading."

Comment from the Field

The *High School Journal* is preparing to add a new feature entitled "Comment from the Field." This will provide space for comment on any phase of secondary education with particular emphasis on ways and means for improving the teaching situation. Material for this section should be comparatively brief and should be in the hands of the editor five weeks ahead of the date of publication for which it is intended. Contributions should be mailed to the *Editor, High School Journal, Box 810, Chapel Hill, N. C.*

Meetings of Note

American Association for Health, Physical Education, and Recreation—*April 18-22,* Dallas, Texas.

American Association of School Administrators—*February 25-March 2,* Atlantic City, New Jersey.

Association for Health, Physical Education, and Recreation (Eastern District)—*March 21-24,* Atlantic City, New Jersey.

Association for Supervision and Curriculum Development (NEA)—*February 12-15,* Denver, Colorado.

Classical Association of the Middle West and South—*April 6-8,* Cleveland, Ohio.

Department of Rural Education (NEA)—*February 27-March 1,* Atlantic City, New Jersey.

Educational Policies Commission—*March 30-April 1,* Washington, D. C.

Eta Sigma Phi (Undergraduate Classical)—*April,* Vanderbilt University, Nashville, Tennessee.

Fifth National Conference on Citizenship—*May 22-24,* Washington, D. C.

Music Educators National Conference (Biennial Convention)—*March 18-23,* St. Louis, Missouri.

Music Teachers National Convention—*February 26-March 2,* Cleveland, Ohio.

National Association of Secondary-School Principals (NEA)—*February 18-22,* Kansas City, Missouri.

National Association of Student Councils—*June 19-22,* West High School, Denver, Colorado.

National Education Association—*July 2-7,* St. Louis, Missouri.

United States Division of International Society for Business Education—*February 24-25,* Atlantic City, New Jersey.

Film Notes

CHARLES MILNER AND KENNETH MCINTYRE

NEAR HOME. British Information Services. 16 mm., black and white, sound, 25 minutes.

Produced for the Ministry of Education, this film shows a class and its teacher planning and carrying out a project based on a study of the community in which they live. In the course of their project, the pupils and teacher can be observed in a learning process

that takes advantage of an inherent interest in things nearby. Although this film is primarily about good teaching, it may be used to accentuate pupil interest in their own communities and serve as a spring board for more creative effort in our Resource Use programs. The film is so expertly done that one is not conscious of the British accents and marked contrasts between our modern classroom equipment and the inadequacies of post-war British schools.

Rental: $2.50 for showing from Bertram Willoughby Pictures, Inc., 1600 Broadway, New York 19, New York.

KNOW YOUR LIBRARY.* Coronet. 16 mm., black and white, or color, sound, 10 minutes.

A brief survey of the over-all organization of a high school library, this film covers the card catalog, Reader's Guide to Periodical Literature, encyclopedias, and vertical file. A professional librarian who previewed this film had few favorable remarks insofar as its value as an instructional medium is concerned. The film has its basic limitations in brevity which reduces information covering the use of the card catalog and other fundamental steps in KNOW YOUR LIBRARY to a few casual remarks. Actual use of the materials available in a library, with the help of the librarian in charge, is by far the most effective method for getting across to high school students what help they may expect to find in the library—the stated purpose of the film. It is generally concluded that a high school student would benefit more from a 10 minute guided visit in his own library than he would from this 10-minute film.

INSTRUMENTS OF THE ORCHESTRA.* British Information Service. 16 mm., black and white, sound, 20 minutes.

An excellent film for music appreciation, INSTRUMENTS OF THE ORCHESTRA is a worthwhile introduction to symphonic music for the high school student. A famous British conductor, Dr. Malcolm Sargent, is the commentator. After a clear-cut demonstration of the sounds of the twenty-six instruments of the symphony orchestra, he conducts the London Symphony Orchestra in Benjamin Britten's Variations and Fugue on a theme by Purcell.

ALGEBRA IN EVERYDAY LIFE. Coronet. 16 mm., black and white, sound, 10 minutes.

This is a new Coronet film aimed at an uncolorful subject which has been a classroom problem for teen-agers for generations.

* May be obtained through the U. N. C. Extension Division Film Rental Service.

The film attempts to show that there is nothing mysterious about Algebra and that it is only a language of numbers. A boy and girl solve a problem confronting them in the preparation for their annual school revue by using Algebra. The emphasis is on three basic Algebraic steps (1) Observation (2) Translation (3) Manipulation and computation. The film illustrates applications of Algebra to everyday life as well as specialized fields, which doesn't prove anything except the fact that a good Mathematics teacher is still one of the best assets for the effective teaching of Algebra. A film of this nature might be used for purposes of motivation, but could not have any tremendous value from any other point of view.

Rental: $2.50 per day from Coronet Films, Inc., Coronet Building, Chicago 1, Illinois.

Notes on New Releases

THE MIDDLE EAST (ISRAEL).* United World Films. 16 mm., black and white, sound, 20 minutes.

This film is expected to be released from United World Films after the first of January. The film is extremely important because it is one of the first 16 mm. sound educational films depicting life in Israel since the war. It is an excellent study of the contrast between the old and the new in a land with a rich religious heritage. It also portrays the rise of a new nation as immigrants arrive to take their places in cooperative settlements where they work on farmlands which have been recently reclaimed from the desert.

Book Reviews

THE EARTH AND MAN, A HUMAN GEOGRAPHY. By Darrell Haug Davis. New York: The Macmillan Company, 1948. Pp. xxiv, 696. $5.00.

It is more than likely, when a search is made for the basis of the issue involved, that the heading of any of today's newspapers will be found to be concerned with a geographical or geopolitical problem. Indeed, such is the rapidly contracting world society that both high school and college orientation courses may easily miss their mark unless a thorough grounding in the basic fundamentals of geography, economics, and politics has been effected. In fact one of the most compelling lessons of World War II is the necessity for a more complete understanding of a global world and its geopolitics.

* May be obtained through the U. N. C. Extension Division Film Rental Service.

Curiously, for some fifty years, American education saw fit to relegate the study of geography, except for advanced study in a few specialized institutions, to the elementary school. Occasionally there were courses in the secondary school entitled "Economic Geography," or, in later years, "Conservation of Natural Resources" and in the ninth grade of schools operating on the junior high school plan superficial offerings in "World Geography" that were not much better than those taken on the elementary level. Colleges as a whole honored the study of geography more in the breach than in the observance and this writer, although he majored in the social sciences, encountered geography only as a subject for graduate study.

Of course to the lack of will to offer courses in geography must be added the lack of suitable textbooks in the subject; these on the whole dealt with the geological and mathematical aspects of geography almost exclusively. There was a general failure to integrate the political with the economic and the areal with the demographic. Climate, it is true, was emphasized but in some instances its contribution was overplayed. Human geography, indeed, went virtually unrecognized in American schools and colleges.

The Earth and Man, subtitled "A Human Geography," sets itself to the task of remedying this omission. Professor Darrell Haug Davis, of the Department of Geography, University of Minnesota, adopts the view that "the how and why of man's visible impress on the earth's surface, as manifested by his works, is affected by natural and regional inheritance"; he attempts to provide "a treatment of man and his economic activities in their areal, environmental settings: a study of terrestrial unities." That he has succeeded in producing a textbook with great possibilities is both a personal achievement and an accomplishment that the whole field of geography can be proud of.

Originally issued in 1942 at the high tide of Nazi and Japanese conquest to meet a need for indoctrination and orientation courses in army training programs and V-12 units the second edition has involved substantial changes. Generally these are (1) an increase in the number of chapters and a greater uniformity in their length and difficulty, as an aid to assignments; and (2) some rearrangement of subject matter to permit the more effective use of the book in either a one semester or a year course.

It is hoped that the production of good texts, and Davis: *The Earth and Man* is one of these, for college geography courses will foster their offering and teaching, and that the Third World War

will not find Americans as geographically ignorant as the first two did. Incidentally, a better knowledge of geography and geopolitics may aid in the establishment of a firmer peace than that which we have known in our own time!

KENNETH V. LOTTICK.

Williamette University, Salem, Oregon.

ADOLESCENT CHARACTER AND PERSONALITY. Havighurst, Robert J. and Hilda Taba. New York: John Wiley and Sons, Inc. 315 pp. $4.00.

As *Elmtown's Youth* is a study of the impact of social stratification upon adolescents, so is this volume an analysis of character and personality in sixteen year old boys and girls, the same community (here called "Prairie City") and some of the same individuals being studied in both works. The sponsor, The Committee on Human Development of the University of Chicago, it is good to note, intends to promote further studies in this typical midwestern city in the interest of a yet more complete understanding of the adolescent in our time and culture.

Though the book itself is primarily couched at the level of *that which is* in the way of moral conduct, the authors imply provocatively that there are certain possibilities of conditioning the developing human being into a "second level of character." This state of character would assure greater stability and consistency in moral responses through causing generalized principles and ethical ideals to replace as dominant motives the sheerly practicable and momentarily profitable.

Overwhelmingly fruitful in its entirety, one feature will seem to thoughtful readers regrettable: that a more thorough and defensible designation of traits representing the entity "moral character" has not been attained. One may and must, however, in order truly to appreciate the conclusions and suggestions of the writers, consider them in the light of a clearly stated, if not universally acceptable, definition, fairly given in the opening pages.

A welcome bit of insight-laden reading for every teacher and youth leader, and for more enlightened parents; a valuable contribution to the literature of a field socially important, but unfortunately as yet very inadequately explored.

VERGIL SCOTT WARD.

ARCHITECTUAL FORUM, Vol. 91, No. 4, October 1949 published by Time, Inc., 350 Fifth Avenue, New York 1, New York.

The October issue of *Architectural Forum* is devoted exclusively to schools. This number gives a summary of the national school-house crisis and an outline of the needed action. Several pages are devoted to developing better and more usable school buildings. There are many valuable case studies given. These cases studies give not only pictures of buildings but also floor plans and cost studies. Some of the newest ideas of school plants are given in the case studies. The technical aspects of buildings are presented in a most readable manner. Excellent articles appear pertaining to structure, heating and ventilation, lighting, acoustics, special areas, and space for special teaching aids. A most interesting pictorial summary is given of the shortcomings of today's school-houses which adhere to extravagant traditional design at the expense of modern technical advances.

This one issue of the magazine is worth the year's subscription price to any school administrator who is planning to build a new high school building.—W.E.R.

MAN'S GREAT ADVENTURE. New Revised Edition. By Edwin W. Pahlow, with added recent material prepared by Raymond P. Stearns. Boston, Ginn and Company, 1949. 815 pp.

This revision differs from the earlier editions only in the addition of two chapters covering world events of the past seven years. Many social studies teachers have been familiar with the book as the adopted basal text for high school world history courses in a large number of states. In contrast to many high school history books which have attempted an "objective" survey of historical events, this work is openly devoted to "tracing the amazing benefits which the present-day system of free enterprise has conferred on the common man." There is thus a strong emphasis throughout upon the economic aspects of our developing culture, and the recurring implication that other aspects have been results of changing economic systems. Aside from this distinction the book is excellently written for high school use, the pictures, charts, and maps are good, and the suggested teaching aids include stimulating listings of reading references, difficult words, study questions, and "things to do." —C. M. C.